

THE EVALUATION OF NATURAL AND ANTHROPOLOGICAL RESOURCES FROM MURES`S INFERIOR BASIN, FOR A DURABLE DEVELOPMENT

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Abstract

The natural conditions of researched area (Mures`s inferior basin) are generally favourable for agro-alimentary sector development, under all the aspects, being an old tradition for cereal cultivation and valorization, especially for animal breedings.

However, that area is situated in subsidiary, divagation and accumulation of Mures`s plain and his geomorphological evolution is correlated by the evolution, in time, of marine domain (Thetys) or lakes domain (Panonic), thing that have generate several types of soils (vertisols, pelosols). These types of soils present two situations: excess of humidity in cold season and deficit of humidity in warm season of the year, the both situation generating multiple form of stress, with negative effects on agro-ecosystems productivity and quality.

Also, the intensive drainages practiced in Banat`s NV area in the last decades of the XXth century have lead to a descend of underground wather from 1-2 m to 5-7 m. In climatic changes and unreasonable exploitation background, the apparence of winds, who had break out by climate aridity, have lead to the apparence of dusty phenomena.

Having in view all this aspects concerning at risk existence, owing sundries manifestation of natural factors or anthropical irrational interventions, the authors of this paper try to transfer the teoretical describatively activities to analitical activities, who offers practical solutions for durable management of soils resources.

INTRODUCTION

Being an important part of national wealth, natural resources are constituted by all the resources from nature: soil, water, air, flora, fauna, solar energy. In some technological, economical and social conditions, these resources are extracted from their natural places and transformed in goods that their use supposing their direct consumption.

The use of these resources have to be practice in a complex, co-ordinated manner, for a simultaneous accomplish of many purposes harmonized with requirements referring environmental protection [1, 2, 3, 4, 5, 6, 7].

The applying of inpropried and incomplete technologies can cause some irreversible changes of natural resources and modify their restoring character.

The factor who transform almost totally and irreversible the natural restored resources is the man.

Natural and anthropic induce resources management represents a modern manner in dealing with land fund and have the aim to maintain or increase soil fertility. Those would allow obtaining high quality alimentary products on long term.

Durable soil management in case of agricultural and forestry terrains, imply taking into account information, energy, material exchange fluxes cycles between soil and the environment (atmosphere, water, flow courses, wildlife, land, vegetation).

In FAO`s terminology "land quality" is defined as a complex of factors which inflame terrain sustained capacity to comply to planned aims. The term covers a wide range of meanings. "Land" refers to soil, shape of terrain, climate, hydrology, wildlife and vegetation, land amelioration, other management measures [4].

Land quality (in Romanian school of Pedology) is defined by all essential qualities and particularities (defined from topographical, geographical, geomorphological, pedological, agrochemical a.s.o. point of view) through which someone can discriminate among land zones a better or a worse quality [7].

Starting from these reasons, the authors try to present in this paper, in base of the dates extracted from scientific researches themes and dates from OSPA Timisoara archives, some aspects regarding the quality state of soils and the evolution of main factors that compete at his accomplishment.

MATERIAL AND METHODS

The treated problems are refering to an surface of 110017.91 ha (table 1), whence 99822.91 ha agricultural land.

Table 1

The structure of land for main utilization categories

Specifi- cation	Arable	Pasture	Hayfield	Vine- yard	Orchard	Agricul- tural	Woods	Other use	Total
ha	86197.9	11315	420	550	1340	99822.91	1671	8524	110017.91
%	86.35	11.34	0.42	0.55	1.34	100	-	-	-
%	78.35	10.28	0.38	0.50	1.22	90.73	1.52	7.75	100

OJCPI Timiș/From statistical report concerning the situation of land fund at 31.12.2006

The examination of ecopedological conditions, werw seting in order and processing dates were made according to „The Pedological Studies Elaboration Methodology“ of ICPA Bucharest, in 1987 and Romanian Taxonomic System of Soils (SRTS-2003).

RESULTS AND DISCUSSION

Owing to his position, the natural conditions (relief, soil, hydrology, vegetation) are specific to a subsidiary, divagation and accumulation low plain, where have developed the main types of soils, that mirror, through their geo-bio-chemical and morphological appropriations, the main landscape characteristics that are decisive for growing and fruit-bearing of main cultivated plants.

The researched area makes part of Aranca Plain and Galatca Plain, like a component of Mures Plain, situated to South of current flow of Mures. The geological past of researched area is connected with the past of Banato-Crisana Plain, being one of the Eastern part of the great basin of sedimentation called Panonic Depression.

The formation phases of Carpathians have differentiated the movement of crystalline blocks from foundation of plain, creating periodically areas with tendency of dip or inverse, the crystalline blocks from East, generally much raised, situated to 1000 m depth (980 m to Gavojdia, in West and South-West go down to 200 m at Giulvaz-Foeni).

The forming of plains from investigated space is strongly connected to base level of Panonic Depression from Middle Danube area, to varied rivers that come from mountains, thing that had determine the evolution of two groups of plains: high plains (situated near hills) and low plains (situated near Tisa).

Low plains start to 80 m altitude and are superposed over subsident area of Pannonic Depression, made by under water evacuation cones, that have been identified under lacustrine sediments, cover with different materials: recent alluvial deposits or eolian deposits.

Depending on variation of morphological, hydrographical, soil conditions and the nature of generating agents, can be identified more sub-units.

Aranca Plain (Felnac-Periam-Valcani), situated between Mures river and Galatca it seems like a large depression and it is the lowest part of researched area, with 77-83 m altitude, with little depressions and banks with general level bigger with 0.5-1.0 m confronted with general level. Also, there are here and there antropical knolls who are lifting with 3-5 m over general level. Generally, this plain is a low area, with old abandoned flows, with high percent of clay in superficial stratification of soils and extended clay minerals, place where an important attention have been given to hidro-improvement works.

Galatca Plain (Pesac-Lovrin-Teremia) is centred on an old bank of Mures and the main flow of Galatca river, with 100 m altitude. This plain is formed by dense alluvial deposits and sand deposits, in Teremia Mare area the surface is covered by sand hill and it is fixed with vineyards.

Though is delimited by actual flow of Mures river, the researched area belonging to hydrographical basin Bega, under basin Berecsău, the most importants flows of wather beeing Aranca and Galatca.

Aranca, an old flow of Mures river, has its springs in waterside of Mures at Felnac, on 10 m under river level and after it crossing our country on 108 km it pouring in Tisa on Hungary territory. Has an important role in collecting wather on 1016 km² depressionary surface, with underground wather at 1-2 m and standstill of surface wather. In rainy periods, because wather gates from border, it can not be evacuate all the wather and the land near are inundated.

For the characterisation of climatic conditions we have use the dates from meteorology stations Sânicolau Mare and Lovrin, but also from Beba Veche, Teremia Mare, Periam.

From the dates of Lovrin and Sanicolau Mare (table 2), we can see that the biggest average of temperature is at Lovrin (10.9⁰C) and the smallest average is at Sânicolau Mare (10.8⁰C).

The biggest monthly temperature average was at Lovrin in august (21.7⁰C) and the smallest at Sânicolau Mare in january (-1.7⁰C).

Table 2

Montly, yearly and multiannualy temperature values (°C)

Station	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Yearly
Lovrin	-1.2	0.8	5.5	11.0	16.6	19.7	21.6	21.7	17.9	11.3	5.4	1.5	10.9
Sanicolau Mare	-1.7	0.4	5.4	11.1	16.3	19.7	21.7	20.9	17.0	11.0	6.6	0.9	10.8

Because of cyclones activiyes and humid air invasion from West, South-West and Norh-West, in high plains from the West area of Romania the precipitations are quantitatively bigger than others part of the country (table 3), exception made by North-West part of the plain.

Table 3

Montly, yearly and multiannualy rainfals values (mm)

Station	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Yearly
Lovrin	31.2	27.5	28.0	40.6	51.6	67.0	54.1	46.1	36.5	36.0	43.1	44.5	506.2
Beba Veche	32.4	30.4	27.4	41.2	55.5	68.6	54.8	53.6	34.1	33.1	42.8	45.6	527.0
Teremia Mare	34.9	33.2	31.0	46.4	57.9	77.4	52.2	52.0	35.0	37.2	46.3	48.8	552.3
Sanicolau Mare	32.8	30.9	29.6	45.4	55.9	75.8	54.1	51.1	37.1	36.5	44.0	47.8	541.4
Periam	35.5	32.7	29.4	45.4	55.2	71.4	48.7	51.4	35.1	35.2	43.5	46.8	530.3

Wind conditions in South-West part of Romania is defined by development of baric systems who interfere above Europe at 45⁰ North latitude (azoric, syberian, scandinavian anticyclone and mediteranean, islandish cyclone).

In the Plain of Mures we find flora and fauna elements similar to all West Plain, represented by historical province Banat and Crisana, with thermophyte and xerophyte plants, balcanic and central-european ecosystems.

From phito-geografical point of view, the flora of researched area belong to “province daco-ilirica” region, the “Plain of Banat” district.

In this context it is necessary to distinguish the importance of wooden species like: *Quercus cerris*, *Quercus fornitto*, *Quercus pubescens*, *Tillia tomentosa*, *Fraxinus ornus*, *Cornus mas*, species that are associated in complex and protect a great number of thermophile grassy species [3].

As a result of geographical position, at the interference of low plains and hills, in the old delta of Mures, the studied territory presents various geological and physical-geographical conditions, matter that have condition the forming of a complex cover of soils.

So, in pressed correlation with the variety of geomorphological factors that cause the existence of a diverse types of relief units, of geological factors that have guide to a diversity of materials (even for a reduced territory, of ha) and of climatic or hydrological factors, with antropical interventions, have result a varied population of soils with specific characteristics (related or totally different) in permanent evolution.

According with Romanian Taxonomic System of Soils (SRTS 2003) and WRB for SR 1998, in researched area have been identified 6 classes, 8 types, 13 undertypes, 136 varieties and other units, which are different through their properties, their productiv capacity and measures for maintainance and increase their fertility. So, the map of soils includes types and undertypes of soil, on a surface of ha, that represents 100% of researched area:

- Arenosols (mollic, gleyed, sodic), represented by 5 TEO (1-5), on a surface of 467.10 ha (0.47%).
- Fluviosols (mollic, gleyed, salic, sodic), represented by 19 TEO (6-24), on a surface of 10328.50 ha (10.35%).
- Chernozems (gleyed, salic, sodic, vertic), represented by 7 TEO (25-82), on a surface of 60279.89 ha (60.39%).
- Cambisols (mollic, gleyed, salic, vertic, sodic), represented by 23 TEO (83-105), on a surface of 5319.06 ha (5.33%).
- Pelosols (gleyed), represented by 9 TEO (106-114), on a surface of 8785.02 ha (8.80%).

- Vertosols (gleyed, salic, sodic), represented by 7 TEO (115-121), on a surface of 8801.94 ha (8.82%).
- Gleysols (mollic, pelic, sodic, salic), represented by 11 TEO (122-132), on a surface of 389.30 ha (3.90%).
- Solonetz (mollic, gleyed), represented by 4 TEO (133-136), on a surface of 1944.10 ha (1.94%).

CONCLUSIONS

1. The systematic pedological and agrochemical mapping carried out by the Pedological and Agrochemical institutes from our country offers valuable data concerning the evolution of the quality status of the soils, the differentiated establishing and application of culture technologies, the bonification of the land, the favoured cultures, the land works, the ameliorative technologies, the organisation and systematisation of the territory.
2. The evaluation and evolution of lands quality is necessary for establishment of the proper technologies in order to assure an ecological equilibrium and which are grounded on the long experiments results with fertilizers, amendments, crop-rotations etc., placed in specific pedo-climatic areas of the Timiș county and managed by representative research and educational institutions: USAMVB Timisoara, SCDA Lovrin, OSPA Timisoara.

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